1058-70 Direct Correlation Between Coronary Artery Disease and Aortic Arch Plaque Thickness Measured by Noninvasive B-Mode Ultrasonography

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Background: Atherosclerotic plaques in the aortic arch are a marker for Coronary Artery Disease (CAD). transesophageal echocardiography (TEE) has been used to visualize these aortic plaques. TEE is moderately invasive. We employed a new non-invasive method for visualization of the aortic arch to assess the correlation with CAD.
Methods: The aortic arch was examined with non-invasive B-mode sonography with an Acuson XP128 (Mountain View, CA) in 517 consecutive patients referred for carotid duplex sonography using a right supraclavicular approach. CAD was defined as previous myocardial infarction, previous surgical or catheter based coronary revascularisation or typical angina pectoris symptoms requiring specific anti-anginal treatment. The presence of cardiovascular risk factors was documented.
Results: The aortic arch could be visualized to measure Intima-Media Thickness (IMT) in 97% of the 517 patients. The IMT was a strong predictor for the presence of CAD (linear regression analysis: R=0.97, p< 0.001).

Intima-Media Thickness	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0	>5.0mm	TOTAL
Number of Patients	259	47	108	47	21	22	504
Coronary Artery Disease	14.4%	40.4%	56.5%	59.6%	81.0%	86.4%	35.6%

The average IMT increased with age, the presence of diabetes mellitus, arterial hypertension, hypercholesterolemia and tobacco smoking.
Conclusions: Aortic arch IMT can be measured in the majority of patients using the right supraclavicular window. The method is non-invasive, allowing sequential examinations applicable to prospective studies of the risk of CAD. Measurement of aortic arch IMT appears to have a stronger predictive value for CAD than other non-invasive imaging modalities.

1058-71 Endothelial Function Is Impaired and Intina-Media Thickness of the Common Carotid Arterial Wall Is Increased in Patients With β-Thalassemia Major

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Background: Patients (pts) with β-thalassemia major (βTM) are at risk of cardiovascular complications. Both endothelial dysfunction and thickening of the carotid arterial wall occur in the presence of atherosclerosis or its risk factors In pts with βTM a depletion of serum antioxidants has been reported. Desferrioxamine improves acutely endothelial dysfunction in pts without βTM. Therefore, we evaluated endothelial function and thickness of the common carotid arterial wall in pts with βTM by means of high-resolution ultrasonography.
Methods: In eighteen pts with βTM (age 26+8 years, ferritin 2396+1754 ng.ml-1, 44% on optimal chelation therapy) without cardiac disease or diabetes mellitus and 18 healthy subjects, flow-mediated dilatation (FMD) was measured as % change of the post-ischemic right brachial artery (BA) diameter. Endothelium-independent, nitroglycerin-induced vasodilatation (NID) and intima-media thicknes of the posterior common carotid arterial wall were also assessed.
Results: The study groups were matched for age, gender, body surface area, blood pressure and smoking habits. Serum cholesterol was lower in pts with βTM (102+39 versus 178+30 mg.dl-1, p = 0.001).

	Pts with βTM	Healthy subjects
BA diameter (mm)	4.07 +/- 0.66	4.06 +/- 0.52
Post-ischemic BA blood flow (ml/min)	313 +/- 220	403 +/- 187
% change of BA blood flow	555 +/- 383*	1072 +/- 661
FMD (%)	5.97 +/- 2.3†	10.44 +/- 4.4
NID (%)	14.86 +/- 6.22	16.66 +/- 4.23
Carotid artery intima-media thickness (mm)	0.54 +/- 0.08†	0.45 +/- 0.07

*p<0.01; †p<0.001

FMD and intima-media thickness did not correlate with ferritin levels.
Conclusion: Our data suggest a proatherosclerotic milieu with reduced bioavailability of nitric oxide in thalassemic patients despite near absence of cardiovascular risk factors. Iron-induced oxidative stress may explain these findings

1058-72 Carotid and Femoral Ultrasound Morphology Screening and Cardiovascular Events in Low Risk Subjects: A Ten-Year Follow-Up Study (the CAFES-CAVE Study)

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BACKGROUND: Subclinical arteriosclerotic lesions at the carotid and femoral bifurcations are related to the occurence of cardiovascular events and of occult coronary disease. Ultrasound of carotid and femoral bifurcations provide a simple screening method to select asymptomatic subjects at risk of future events. METHODS AND RESULTS: 13221 low-risk, healthy, asymptomatic individuals were included in a 10-year, prospective, follow-up based on carotid and femoral bifurcation morphology defined by B-mode ultrasound. Four classes were considered at inclusion (I: normal wall, II: wall thickening, III: non stenosing plaques, IV: stenosing plaques). When 10000 subjects (75.6% of included subject; 6055 males, 3945 females) completed the 10-year follow-up the study was concluded. At 10 years there were 10 events (out of 7989 subjects) in class I and 81 events in II (930 subjects; incidence=8.6%); 239 events were observed in class III (611 subjects; 39.28%) and 381 events (470 subjects; 81.06%) in IV; 61 deaths occured in classes III+IV (1081 sujects) producing a death rate within these two classes of 5.5% (51 out of 61 = 81.5% in class IV). The increased event rates in classes III and IV were significant (log rank; P<0.02) in comparison with I and II. CONCLUSIONS: carotid+femoral morphology identified 2011 subjects (20.1% of the population) in classes II, III, IV including 98.6% of cardiovascular events and deaths in 10 years. A higher (P<0.05) rate of progression in classes III and IV in comparison with I and II was observed. The ultrasound carotid+femoral classification is useful in selecting subjects at very low risk of cardiovascular events (class I), those at limited risk (class II) and a group at moderate risk (clas III). A subpopulation at high risk of cardiovascular events (IV) was identified. A comparable parallel groups of 245 (355 included, 110 drop-outs) of hyperlipidemic-hypertensive patients under treatment were also included. In this group the event rate at 10-year was <1% in class I, 11.5% in II, 43% in III and 83% in IV. Therefore the event rate was associated to the arterial class more than to hypertension and hyperlipidemia.

1058-93 Is Carotid Artery Atherosclerosis a Bilaterally Symmetrical Disease?

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Background: Carotid atherosclerosis is a major cause of transient ischemic attacks and stroke in the western world. It is expressed as lesions in the carotid arteries, extending from the common carotid, through the bifurcation, and into the internal carotid. Since the left and right carotids are anatomically similar and exposed to similar physiologic conditions, we hypothesized that the development and morphology of plaques in the two arteries should be similar.
Methods: MRI images of pressure-perfusion fixed carotid pairs excised from 50 human cadavers (74±13yr) were acquired using a GE 1.5T clinical MRI with an in-plane resolution of 0.195mm and a slice thickness of 3mm. 38 pairs were suitable for measurement of artery volumes. An active contour algorithm was used to detect the boundaries of the arterial wall and lumen on the serial MRI slices. Normal wall and plaque volumes were estimated using an automated algorithm. All slices were registered to the bifurcation, which was defined as the most proximal slice with two complete lumens. Average slice volumes were calculated for left and right arteries.
Results: For the internal, external and common carotid plaque slice volumes, concordance correlation coefficients (95% CI, number of slices in branch) between sides were 0.99 (0.95-1.0, N=7), 0.97 (0.84-0.99, N=7), and 0.96 (0.88-0.99, N=11), respectively. Plaque volume was greatest around the bifurcation, with 80% located within 9mm, 12mm, and 18mm of the bifurcation in the internal, external and common branches, respectively.
Conclusions: These analyses demonstrate that left and right carotid arteries in humans of advanced age have similar volumes and longitudinal locations of atherosclerotic plaques, suggesting that plaque radial location and composition may also be similar.

1058-94 HRT Modulates Brachial Artery Diameter and Flow-Mediated Dilation: The NHLBI-Sponsored Women's Ischemia Syndrome Evaluation (WISE) Study

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Background. Hormone replacement (HRT) studies have documented improvements in brachial artery flow-mediated dilation (FMD) in postmenopausal women. However such studies have not adjusted for baseline diameter (BBA), recently shown to be strongly predictive of FMD. **Methods.** We evaluated 342 participants in WISE who underwent coronary angiography for suspected myocardial ischemia, brachial artery FMD testing, and risk factor, reproductive history and blood hormone level assessment. Mean age was 58±11 (range 32-83) years, 73% were postmenopausal, 41% were currently on HRT, and 35% had CAD (≥50% stenosis in ≥1 coronary artery). **Results.** BBA and FMD were negatively correlated (Spearman r=-0.17, p=0.002). Among individual coronary risk factors, including lipid and hormone levels, only BBA, blood estradiol (E2), and age/HRT interaction (FMD decreased with age among HRT nonusers, slightly increased in users) correlated with FMD. In stepwise multivariate models (table), BBA was the strongest predictor of FMD, followed by age/HRT interaction. Independent predictors of BBA were age, current HRT, hypertension, obesity, and CAD. **Conclusions.** Among women undergoing angiography for suspected ischemia, brachial artery size was dependent on age, estrogen level (HRT), hypertension, obesity, and CAD. Although brachial artery size was the strongest predictor of FMD, HRT independently counteracted the age-related deterioration of brachial artery endothelial function.

Parameter Estimates (p-values) of Significant Independent Predictors of Brachial FMD and BBA

Significant Predictors	Flow-Mediated Dilation (FMD) (Range -20.6, 44.9 %)	Baseline Artery Diameter (BBA) (Range 20, 64 mm)
BBA	-0.15 (.006)	--
Age (Years)	-0.12 (.05)	0.15 (.005)
Current HRT	-0.61 (.05)	-0.14 (.004)
Age*HRT	0.60 (.05)	NS
CAD	NS	0.22 (.0001)
Diastolic BP (DBP)	NS	0.18 (.0001)
Systolic BP (SBP)	NS	-0.16 (.01)
HTN Treated if SBP>120	NS	0.19 (.0004)
BMI	NS	0.16 (.003)